WHAT IS CLAIMED IS:

1. A method of making a ceramic composite comprising associating a polymeric ceramic precursor with at least one metallic element to form a preceramic composite, and subjecting said composite to pyrolysis by high frequency microwave radiation, until the polymeric ceramic precursor is converted into a ceramic having said at least one metallic element integrally formed as part of said composite.
2. The method of claim 1 wherein the microwave radiation is in the form of a beam.
3. The method of claim 2 wherein the preceramic ceramic precursor is a fluid placed in a microwave-permeable mold loaded with a susceptor.
4. The method of claim 3 wherein the microwave radiation is at least about 20 GHz.
5. The method of claim 1 wherein the metallic element is grounded prior to exposure to high frequency microwave radiation.
6. The method of claim 1 wherein the susceptor is a continuous SiC fiber, chopped SiC fiber, milled SiC fiber, SiC whisker, SiC particulate, SiC flake, continuous carbon or graphite fiber, chopped carbon or graphite fiber, milled carbon or graphite fiber, carbon or graphite whisker, carbon or graphite particulate, carbon or graphite flake, or other forms of SiC, carbon, and graphite found to be effective susceptors.
7. The method of claim 6 wherein the susceptor is a SiC.
8. The method of claim 1 wherein the metallic element is made of any metal and/or metal alloy that can conduct electricity in a metallic fashion.
9. A method of making a ceramic composite comprising placing a fluid polymeric ceramic precursor loaded with a susceptor in a mold, associating therewith at least one metallic element made of any metal and/or metal alloy that can conduct electricity in a metallic fashion to form a preceramic composite, and subjecting said composite to pyrolysis by microwave radiation of at least about 20 GHz for a time

sufficient to convert said polymeric ceramic precursor to a ceramic having said at least one metallic element integrally formed as part of said ceramic composite.

10. The method of claim 9 wherein the microwave radiation is in the form of a beam.
11. The method of claim 10 wherein said susceptor is a continuous SiC fiber, chopped SiC fiber, milled SiC fiber, SiC whisker, SiC particulate, SiC flake, continuous carbon or graphite fiber, chopped carbon or graphite fiber, milled carbon or graphite fiber, carbon or graphite whisker, carbon or graphite particulate, carbon or graphite flake, or other forms of SiC, carbon, and graphite found to be effective susceptors.
12. The method of claim 11 wherein the susceptor is a SiC.
13. The method of claim 9 wherein the ceramic is densified by adding additional polymeric ceramic polymer thereto and again pyrolyzing the composite by said energy.
14. A method of making a ceramic composite comprising forming a fiber reinforcement infiltrated with a polymeric ceramic precursor, associating at least one metallic element therewith to form a preceramic composite, and subjecting said composite to pyrolysis by high frequency microwave radiation, until the polymeric ceramic precursor in said composite is converted into a ceramic having said at least one metallic element integrally formed therewith.
15. The method of claim 14 wherein the microwave radiation is in the form of a beam.
16. The method of claim 15 wherein the microwave radiation is at least about 20 GHz.
17. The method of claim 15 wherein the metallic element is made of any metal and/or metal alloy that can conduct electricity in a metallic fashion.
18. The method of claim 14 wherein the fiber reinforcement is a continuous SiC fiber, chopped SiC fiber, milled SiC fiber, SiC whisker, SiC particulate, SiC flake, continuous carbon or graphite fiber, chopped carbon or graphite fiber, milled carbon or graphite fiber, carbon or graphite whisker, carbon or graphite

particulate, carbon or graphite flake, or other forms of SiC, carbon, and graphite found to be effective susceptors.

19. The method of claim 14 wherein said ceramic is densified by at least one additional infiltration thereof with a polymeric preceramic precursor and pyrolysis thereof by said energy.

20. A method of making a ceramic composite comprising forming a fiber reinforcement infiltrated with a polymeric ceramic precursor, associating therewith at least one metallic element made of any metal and/or metal alloy that can conduct electricity in a metallic fashion to form a preceramic composite, and pyrolyzing the polymeric ceramic precursor in said composite by a beam of microwave radiation of at least about 20 GHz for a time sufficient to convert said polymeric ceramic precursor to a ceramic having said at least one metallic element integrally formed as part of said ceramic composite.

21. The method of claim 20 wherein the fiber reinforcement is a continuous SiC fiber, chopped SiC fiber, milled SiC fiber, SiC whisker, SiC particulate, SiC flake, continuous carbon or graphite fiber, chopped carbon or graphite fiber, milled carbon or graphite fiber, carbon or graphite whisker, carbon or graphite particulate, carbon or graphite flake, or other forms of SiC, carbon, and graphite found to be effective susceptors.

22. A ceramic composite having integrally formed therewith at least one metallic element.

23. A fiber reinforced ceramic composite having integrally formed therewith at least one metallic element.

24. The ceramic composite of claim 22 wherein said at least one metallic element is first associated with a polymeric ceramic precursor to form a composite and the polymeric ceramic precursor in the composite then pyrolyzed to a ceramic by a beam of high frequency microwave radiation.

25. The fiber reinforced ceramic composite of claim 23 wherein said at least one metallic element is first associated with a fiber reinforcement infiltrated with a polymeric ceramic precursor to form a composite and said composite then subjected to a beam of high frequency microwave radiation to pyrolyze said polymeric ceramic precursor to a ceramic.